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Putting Computers to Work in China: Priorities, Problems, and Prospects

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An Intelligence Assessment

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*EA 86-10004
February 1986*

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An Intelligence Assessment

This paper was prepared by [redacted]
Office of East Asian Analysis. Comments and queries
are welcome and may be directed to the Chief,
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**Putting Computers to Work
in China: Priorities,
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Key Judgments

*Information available
as of 27 January 1986
was used in this report.*

Over the past several years, Beijing has embarked on an ambitious plan to computerize planning, production, and inventory management in China's industrial sector, and to automate logistics and command and control of the military. It has done so by sharply increasing imports of computers—purchases of microcomputers more than doubled last year; encouraging domestic assembly and production; developing new administrative controls; and allocating funds for improved software development, maintenance, repair, and education.

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Efficient, effective, and widespread use of computers will be slow in coming. A shortage of qualified service, software, and training personnel; inadequate supplies of peripheral equipment; poor data communications links; and general infrastructural weaknesses keep as many as 80 percent of China's computers from being used effectively—if at all. Continuing bureaucratic confusion also slows progress. The organization nominally responsible for overseeing China's computer program—the Leading Group for the Invigoration of the Electronics Industry—has not yet proved able to ensure that imports fill the requirements of a dozen different ministries or to coordinate the work of researchers and producers in military and civilian entities. Finally, US and multilateral export controls will continue to limit the types of computers and software available to China for such applications as sophisticated design work, computer networking, seismic data processing, and weather forecasting. These problems will keep the Chinese from establishing reliable nationwide computer networks until at least the mid-1990s.

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Nonetheless, over the next five years, we expect China to make progress toward boosting its computer inventory and improving computer use. Computer imports and domestic production will continue to increase, and we expect microcomputers that are assembled in China from imported kits gradually to substitute for imports. As China's software and service personnel increase both in number and in experience, moreover, computer utilization will also improve. This optimistic view is supported by several factors: high-level endorsement of and financial backing for computerization, recently liberalized US and multilateral export controls for some types of computers, and the establishment of joint Chinese-Western production facilities.

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The growth of computer use, in turn, will lead to improvements in product quality, productivity, and energy efficiency, and to lowered production

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costs. But here, too, there are limits. Low wage rates, inflexible factory management practices, and a lack of labor mobility will, in our judgment, limit the financial benefits to Chinese industry from the introduction of computers. Moreover, some managers reportedly do not use their computers for inventory control because to do so would eliminate “backdoor” sales and supply channels.

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Some civilian computer projects have military applications. We believe a current project to link Western minicomputers and mainframes at China’s universities is tied to the Chinese military’s plan for a computerized command network. A project involving the automation of track scheduling and reservations for China’s railways—which involves secure fiber-optics technology—may also be backed by the military. But military data networks necessary for improved command and control will be delayed by the need to improve data communications links, and export controls on design software will impede Beijing’s advances in military research and development.

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The United States will remain a critical partner in China’s program to promote the use of computers. US firms so far have been the most willing to transfer computer production technology, and US computer equipment enjoys a reputation in China for reliability, systems compatibility, and servicing ease. Nonetheless, stringent restrictions still apply to sales of networking equipment and intercity data communications lines, and Washington will face continued pressure from Beijing to permit sales of this equipment. Beijing might even threaten to delay purchases of US computer equipment for nationwide networks until it can purchase the requisite networking technology as well.

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**Putting Computers to Work
in China: Priorities,
Problems, and Prospects**

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The Goal: Widespread Use of Computers

During much of the last decade, China used computers primarily for projects that required data calculations on a massive scale—processing seismic data for the energy sector, conducting a national census, and forecasting weather, for example. In recent years, shifts in China’s economic modernization strategy and in military requirements have shaped the selection of additional priorities for computer use. China’s economic reform program heavily emphasizes improved productivity, more efficient management, reliable energy supplies, and expanded transport capacity—all areas in which computers can bring significant results. Computerized communications systems for command, control, and logistics are also an integral part of Beijing’s plans for military modernization. The advent of sophisticated, versatile, and inexpensive microcomputer technology, and US and COCOM adoption of more liberal export policies have also contributed to China’s redirection of computer resources.

Beijing recognizes the importance of modern data-processing and communications systems to both industry and defense, and is embarking on an ambitious program to broaden the use of computers in these sectors. A number of ministries and central agencies have undertaken programs to apply computer technology to production and planning. Priorities for use of computers include:

- Computer-aided design (CAD) of large-scale integrated circuits and aerospace vehicles.

- Process control and resource management in the metallurgy, manufacturing, and machine-building industries.
- Inventory control, supply scheduling, and financial accounting in factories.
- Planning, logistics, and training for units of the People’s Liberation Army (PLA).
- Processing seismic data for China’s petroleum sector.
- Improving research facilities at key universities.

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Other priority projects require computer networks and data transmission links between cities:

- Scheduling passenger reservations and freight transport on China’s rail and air lines.
- Predicting medium- and long-range weather conditions.
- Processing national census or industrial information.
- Keeping records of technology purchases made by national and local trading corporations.
- Automating transaction processing by the banking system.
- Storing and disseminating technical information retrieved from data bases in the United States, Canada, and Italy.
- Enhancing military communications, command, and control.

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Strategy

To spread computer use, Beijing initially sought to increase the number of computers available by increasing both imports and domestic production. As

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² Appendix A contains details of China’s priority computer projects.

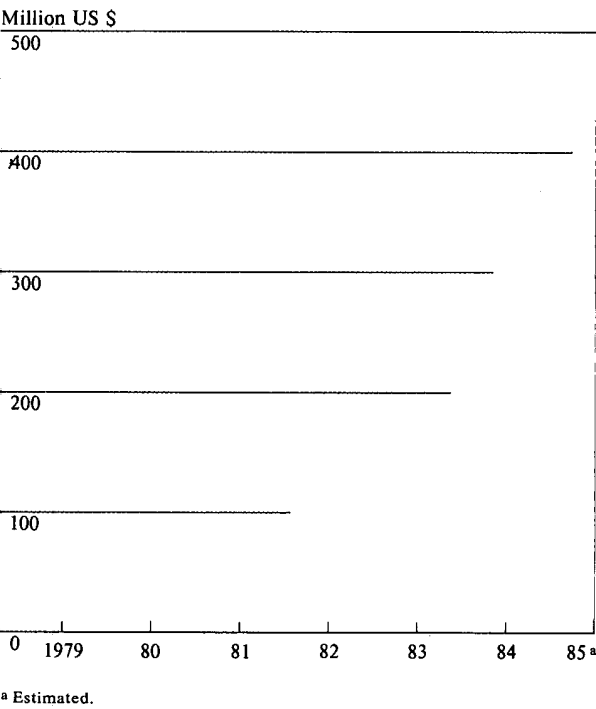
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¹ This assessment draws primarily on embassy or consular reporting. In addition, the Chinese have recently begun to provide information in the open press about the country’s computer production capabilities and limitations, and problems with effective computer use. Trade data reflect overt acquisitions only, and are based on US customs statistics and United Nations’ member country reporting.

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Figure 1
China: Imports of Computers and Related Equipment, 1979-85



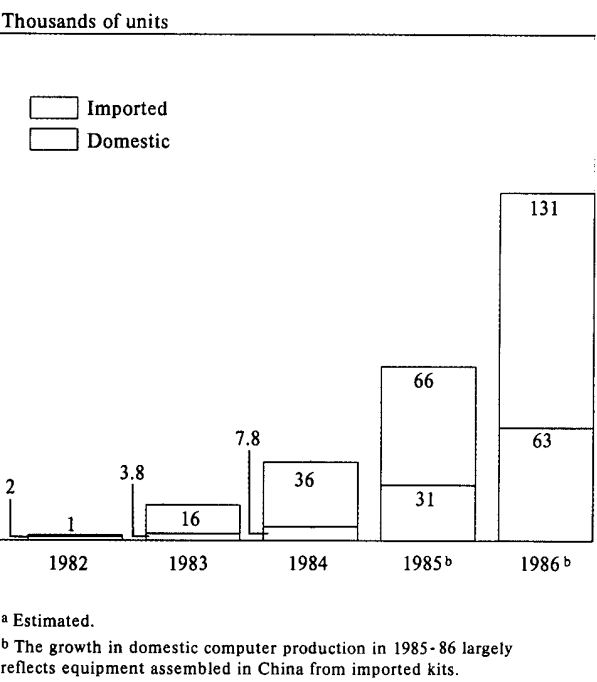
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China's inability to absorb the technology became increasingly apparent last year, however, Beijing strengthened its efforts to boost the ranks of computer personnel, and to exert better control over the quality of computer imports and domestic goods.

Increase the Stock of Computers

Expand Imports. After three of China's powerful commissions—Planning, Economics, and Science and Technology—announced a September 1983 decision to focus on microcomputers instead of larger computers, imports soared. Although precise figures are not available, drawing on fragmentary information based on US trade statistics, [] and Chinese press reports, we judge that Chinese purchases of micros increased from 20,000 in 1983 to 30,000 in 1984, and roughly 65,000 in 1985.

Figure 2
China's Stock of Computers, 1982-86^a



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The announcement also coincided with a decentralization of foreign trade control that resulted in a proliferation of small, loosely regulated trading companies eager to profit from the growing demand for computers. China's imports of microcomputers and larger systems reached \$330 million in 1984—triple the level of 1983—and may have exceeded \$400 million in 1985, according to UN trade data (see figure 1).

Boost Domestic Production. Nationwide, the surge in imports overshadowed production gains recorded by the domestic industry. Since 1982, imports have exceeded domestically produced goods in China's computer inventory; imports now account for an estimated two-thirds of China's stock (see figure 2). In

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individual enterprises, users developed a clear preference for imports over domestically produced equipment. [] They considered imports to be more reliable, more easily linked to other computers and systems, and to have a wider range of software and peripheral equipment available. The relatively high prices for domestic computers provided additional justification for users to seek imports. As a result, in the last few years, a number of Chinese factories stopped producing indigenous computer models, finding it more lucrative to assemble computer kits or to sell fully assembled imports, according to [] consular reports. []

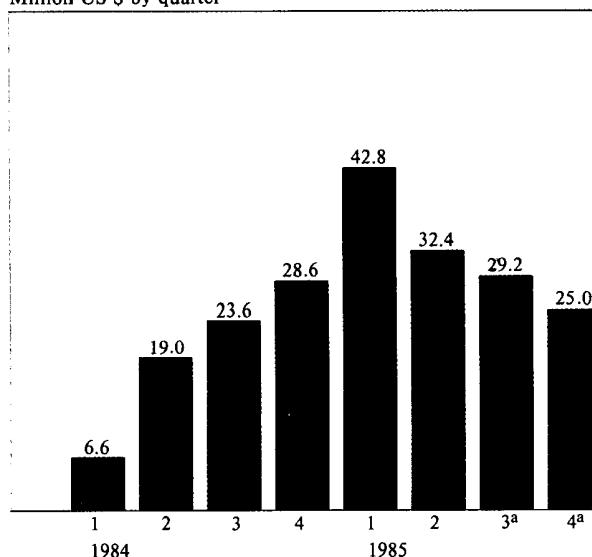
Apparently concerned that foreign domination of China's computer market might stunt development of the domestic industry, Beijing in early 1985 implemented measures to curtail imports and encourage production in China. Beijing dropped prices on domestically produced microcomputers, cut the duty on computer components imported for assembly, more than doubled tariffs on microcomputer imports, and imposed a 40-percent import surtax on micros. China further curtailed computer imports by centralizing its import-licensing system over 15 key commodities, including microcomputers, and by reimposing controls on foreign exchange expenditures that limited major purchases to those for essential projects already in the state plan. Finally, in May 1985, the State Council adopted regulations on technology imports that formally tied purchases of advanced equipment—including computers—to transfers of production know-how. US export figures reflect the combined impact of these measures on computer sales to China in 1985 (see figure 3). []

Make Better Use of Computers

The Chinese openly admit that one-half to four-fifths of the country's computers are being used ineffectively—if used at all. Chinese users [] have reported that computers produced in China are outdated, unreliable, and incompatible with other Chinese or imported models. Moreover, imported computers may be obsolete, low-quality, or counterfeit goods that are frequently incompatible with other equipment or simply unserviceable. Inadequate maintenance, the absence of applications software and peripheral equipment, improper training,

Figure 3
US Exports of Computer Equipment to China, 1984-85

Million US \$ by quarter



^a Estimated.

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and poor data communications links, moreover, have limited effective operation even of better quality imports. [] Over the past two years, China has introduced a variety of measures to improve computer utilization. []

Setting Standards. Beijing has tried for several years to limit computer imports to selected models, [] Leaders renewed their efforts in the middle of 1985, when—to replace a dormant standardization committee formed two years earlier—they gave the Bureau of Computer Industry of the Ministry of Electronics Industry (MEI) expanded power over the planning of a coherent computer

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development and purchase policy. Initially, attempts to standardize were probably designed to take advantage of the abundant software available for certain computer models; more recently, we believe the Chinese are prompted by increased interest in computer networking.

Writing Software. Beijing has earmarked at least \$200 million for software development over the next five years, and hopes to increase its corps of software programmers from 10,000 in 1984 to 100,000 in 1990, according to press reports. The massive effort is motivated, in part, by the hope that China can

produce software for export; in part, as an offshoot of developing software to make computers more useful. In April 1984, the MEI formed the China Software Technology Company (CSTC) to draw up a five-year plan for the country's software industry and to coordinate the plan's implementation. CSTC, in turn, formed the China Association for Software Industry several months later to distribute software. In 1985, independent of CSTC, the State Science and Technology Commission announced its plan to set up "world

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class" software centers in Shanghai and Beijing. US computer scientists are already beginning to train staff for the centers. [REDACTED]

Finally, Beijing has solicited foreign firms to cooperate with Chinese programmers in developing software and, despite the absence of legal protection against pirating, has attracted more than 20 foreign partners—60 percent of them from Japan.³ [REDACTED]

Developing Chinese Character-Processing Methods.

To make computers accessible to more of its people, China must develop methods for coding and manipulating Chinese character information. Chinese universities and institutes are widely reported to be working on more than 400 methods. Military research centers are actively working on character coding because it could speed command and control—which now uses cumbersome four-digit telegraphic codes to represent individual characters—without forcing field personnel to learn English. Western vendors are working to develop methods to accommodate the large number of potential computer users who do not know English. In January 1986, Beijing issued criteria for selecting character-processing methods. [REDACTED]

Enhancing Data Communications Links. The leadership ranks progress in improving China's outmoded and overworked telecommunications system among the top priorities for the country's economic development program. [REDACTED]

³ China's 1983 patent law does not cover software, and Beijing's accession to the Paris Convention for the Protection of Industrial Property in December 1984 is not enforceable because Beijing does not recognize the jurisdiction of the International Court of Justice. [REDACTED] Chinese users have generally refrained from unauthorized copying of software programs, however. [REDACTED]

Easing Shortages of Peripheral Equipment. Over the last few years, Chinese factories have signed assembly agreements with Western firms for printers, terminals, floppy disks, and disk drives. As a result of some of these arrangements, the availability of peripherals—especially for imported computers—is slowly improving. Beijing has not formed any central authority specifically to oversee the purchase and development of peripheral equipment, however, and the availability of peripherals for indigenous computers remains poor. [REDACTED]

Providing Maintenance. The MEI formed the China Computer Technical Service Company (CCTSC) in 1980 to ensure that adequate training, aftersales service, and transfer of production technology accompanied computer imports. CCTSC, with 3,000 employees, has set up service centers in nearly all of China's provinces, and has signed at least four cooperative service agreements with foreign computer vendors. In addition, the China National Instruments Import-Export Corporation (INSTRIMPEX) is increasingly providing maintenance and repair services to users for whom it has made purchases. INSTRIMPEX exercises control over as many as 5,000 additional service personnel, and has signed at least nine cooperative service agreements with foreign firms. [REDACTED]

Improving Computer Training. CCTSC also coordinates an active nationwide program to improve computer literacy. In 1984, it set up 41 training centers, announced plans for at least 10 additional sites, and produced a series of educational videotapes for micro-computer users. Independently, elementary and middle schools have begun to offer computer courses, and magazines aimed at beginning computer users have proliferated. [REDACTED]

Who's in Charge?

The program to spread the use of computers throughout the nation crosses many institutional boundaries.

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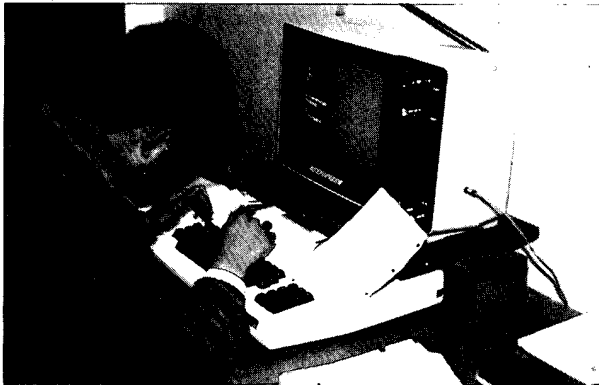
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A Shanghai middle school student learns to use a personal computer in an afterschool program.

Producers include the Ministries of Electronics, Astronautics, and Posts and Telecommunications; universities under the State Education Commission; and the Chinese Academy of Sciences. Users encompass every conceivable sector—military and civilian industries alike; institutes as well as factories. Each ministry has at least one import corporation of its own, state-sponsored technology import corporations make purchases for several ministries at a time, and independent traders operate as free agents during periods of decentralized foreign trade control.⁵ Given China's difficulty matching needs with supplies even within a single ministry, the problem of coordination across so many bureaucratic boundaries is immense. [REDACTED]

Beijing has tried for three years to coordinate the development of China's computer sector and related industries. Its first step, in late 1982, was formation of the State Council's Leading Group for Computers and Integrated Circuits. It soon became apparent that the group's scope was too narrow: it had been unable to limit the volume or quality of computer imports, to ensure that purchases were appropriate for users' needs, or to raise utilization rates. Less than two years after it was established, Beijing reorganized the group, adding representatives from China's telecommunications sector, a handful of industrial and defense-related ministries that are major users of computers, and the ministry that oversees a large [REDACTED]

China: Key Computer Policymaking Agencies

Leading Group for the Invigoration of the Electronics Industry includes representatives from:

- *National Defense, Science, Technology and Industry Commission*
- *State Science and Technology Commission*
- *State Economic Commission*
- *State Planning Commission*
- *State Education Commission*
- *Ministry of Electronics Industry*
- *Chinese Academy of Sciences*
- *People's Bank of China*
- *Ministry of Posts and Telecommunications*
- *Ministry of Water Resources and Electric Power*
- *Ministry of Railways*
- *Ministry of Machine-Building Industry*
- *Beijing Municipality*

Ministry of Electronics Industry:

- *Bureau of Computer Industry*
 - *China Computer Technical Service Company*
 - *China Software Technology Company*
 - *China Association for Software Industry*

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share of China's computer imports. To reflect its broader charter, Beijing also renamed it the Leading Group for the Invigoration of the Electronics Industry. Despite Beijing's efforts to include all relevant parties, dozens of agencies that are active users of computers are not represented on the body and continue to operate independently. A sizable portion of the trade in computers also remains outside of the Leading Group. In fact, in the year and a half since the restructuring, the new Leading Group has reportedly convened only once. Moreover, it has no funds of its own, deriving authority largely from the importance of its leader, Vice Premier Li Peng (see inset).

[redacted]

Outlook: Progress Impeded by Bureaucracy and Trade Controls

Over the next five years, we expect China to make progress toward boosting its computer inventory and improving computer use. Computer imports and domestic production will continue to grow, and we expect microcomputers that are assembled in China from imported kits gradually to substitute for imports. As China's software and service personnel increase both in number and in experience, computer utilization will also improve, in our judgment. Key factors contributing to progress in these areas include:

- High-level endorsement of efforts to promote the use of computers, and strong financial backing for most initiatives.
- Liberalized US and multilateral export controls, and streamlined COCOM procedures for expediting case review.⁶
- Establishment of cooperative production facilities and service centers involving Chinese and foreign partners.
- Emphasis at colleges and universities on turning out qualified programmers.
- Increased attention to training service technicians abroad as part of purchase agreements. [redacted]

⁶ The changes in COCOM export policy for China announced in October 1985 will shorten the waiting period between export license application and approval for the majority of Chinese cases. Upon implementation, licenses for low- or intermediate-level technology will be granted by individual countries, with notification to COCOM after licensing approval has been granted. [redacted]

In our judgment, however, bureaucratic rivalries and inefficiencies will delay the formulation and implementation of a coherent strategy for the development of China's information industries, keeping China from taking full advantage of its computers. Export controls and the reluctance of suppliers to transfer production technology will impede advances in China's ability to produce minicomputers and mainframes.

[redacted]

Although the reorganization of the electronics Leading Group brought in many of the producers and users the original group had excluded, we believe it will remain unable to bring order to China's electronics and information industries. Rivalries and funding problems will impede attempts to improve China's data communications capability, probably delaying the deployment of nationwide computer networks until the mid-1990s.⁷ The absence of strong central coordination will also adversely affect the availability of peripheral equipment and attempts to adopt national standards for computer equipment and Chinese character software. [redacted]

US and COCOM controls on exports to China will continue to curtail the sale of large computers, sophisticated software, and networking technology for some applications, including robotics, microcircuit design, seismic data processing, weather forecasting, weapons development, and data networks of all types that operate over long distances. Export controls will probably also continue to impede or even to bar transfers of mainframe manufacturing technology, leaving Beijing dependent on imports of larger computers.⁸

[redacted]

[redacted]

⁸ China signed its first agreement with a foreign firm providing for mainframe assembly in mid-1985. The joint venture is with a US firm. The export license for this case—the first of its kind—is under review. [redacted]

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Secret**Implications****... For China's Economy**

We believe the introduction of computers to economic planning, industrial production, and transport scheduling will—after what may be an extended period of adjustment—improve product quality, raise productivity, increase energy efficiency, and cut production costs. The Chinese press has already noted some impressive—and often exaggerated—results from the use of computers: steel and cotton mills earning hundreds of thousands of dollars extra because of increased efficiency, heavy industries reducing energy consumption by 25 percent, and transportation costs being cut by millions of dollars each year, for example. Low wage rates, inflexible factory management practices, and a lack of labor mobility will, in our judgment, limit the financial benefits to Chinese industry from the introduction of computers, however. Some managers reportedly do not use the computers they have to control inventory and schedule supplies, because to do so would eliminate the “backdoor” sales and supply channels they have carefully cultivated over the years, closing off routes of opportunity for enterprising individuals. Furthermore, because Chinese labor is cheap and computers are expensive, computers do not always reduce unit costs—even if they do raise output and improve product quality. Finally, to realize the productivity gains expected where computers replace human labor, enterprises must either fire or retrain workers; but, more often, Chinese factories continue to employ displaced workers by creating unnecessary tasks for them. One Beijing factory, for example, reportedly trimmed its work force by more than 8,000 laborers when it computerized production, then found jobs for the workers planting trees and recycling refuse. [REDACTED]

... For Military Modernization

Enhancing Command and Control. We believe the establishment of either civilian or military data networks—though likely to be delayed for at least a decade by the need to improve data communications links—will enhance military communications, command, and control. Chinese press reports indicate that the PLA has already deployed a computerized long-distance communications link—with Chinese character capability—to be used for administration and

management functions in peacetime, and command and control operations in time of war. Civilian networks would also contribute to China's communications, command, and control capability by providing the PLA with systems that could be taken over in time of war and by familiarizing military personnel with computer networking techniques. From a technical standpoint, data networks to be used for planning and administration or dissemination of technical literature do not differ substantially from those suitable for command and control of military forces. Moreover, several of the planned networks with an overt civilian application may be linked to China's efforts to upgrade its military command and control:

- We believe a project to link Western minicomputers and mainframes at 14 of China's universities could be tied to the PLA's plan to link its scattered computers into a computerized command network. Overlaps in personnel and similarities in the equipment involved support this judgment. In addition, Chinese planners have acknowledged that the computers selected for the universities were chosen because they were used in the US Worldwide Military Command and Control Network. Moreover, one of the universities houses part of China's strategic missile force, which is attempting to procure up to 200 additional computers for a nationwide network.⁹
- We further judge that a project involving the automation of track scheduling and reservations for China's rails could be backed by the military. This project involves computer models that are prized by military users, as well as fiber-optics technology that could provide a secure communications capability. [REDACTED]

[REDACTED] The PLA would almost certainly assert control over the railroads' computer network in a time of need. [REDACTED]

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Improving Logistics, Training, and Research and Development (R&D). Over the next few years, we expect greater use of computers to enable the PLA to streamline administration and training tasks—allowing more efficient use of personnel, equipment, and supplies—and improving combat readiness. Increased use of computers in military R&D and production will contribute to China's ability to design and manufacture aerospace vehicles and electronic components for missile guidance. Poor data communications links will slow transmittal of logistic information, however, and export controls on design software will impede advances in military R&D by forcing Beijing to develop the more sophisticated programs required for computer-aided design (CAD) indigenously. [REDACTED]

... And for the United States

The United States is a critical partner in China's program to promote the use of computers. Outside of Hong Kong—whose computer exports are mainly of US or Japanese origin—the United States is China's largest single supplier of computer equipment, with 1985 sales estimated at \$130 million. US computer equipment enjoys a good reputation for reliability, systems compatibility, and servicing ease in China.

[REDACTED]

[REDACTED] As Beijing strengthens the ties between purchases and technology transfer, the greater willingness among US firms to transfer technology could further boost their share of China's computer market. [REDACTED]

[REDACTED]

The United States plays a key role in China's efforts to develop nationwide computer networks. All of China's planned data networks are based on US mainframes and minicomputers, although some will use Japanese or European microcomputers or communications links as well. Despite the general liberalization of US and COCOM export controls for China, stringent restrictions apply to sales of networking equipment and intercity data telecommunications lines. The sale of long-distance data transmission lines has been a contentious issue among COCOM allies, and the United States faces continued pressure from COCOM members as well as Beijing to permit sales of this equipment. Beijing might also threaten to delay purchases of US computer equipment sought for nationwide networks until it appears likely to be able to purchase the requisite networking technology as well. [REDACTED]

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Appendix A

Priority Areas for Computer Use

Product Development

To shorten design time, reduce the possibility of error, and cut the hefty costs usually associated with new product development, Chinese planners have made computer-aided design (CAD) a priority for funding during the coming Seventh Five-Year Plan (1986-90). Some of China's highest priorities for using CAD are development of layouts for very-large-scale integrated circuits and printed circuit boards, and aerodynamic testing of airplanes and spacecraft before prototype production. China has acquired some CAD technology for design of microelectronics devices from US, French, and Japanese firms and continues to seek embargoed software for more sophisticated design work from these suppliers as well as from Hong Kong.

[REDACTED]

Manufacturing

Vice Premier Li Peng, China's leading spokesman for the electronics industry, said in 1984 that China's traditional industries should be the first to receive computer technology. Li's statements, seconded by China's senior leadership, underscored the importance of transforming China's dated industrial infrastructure to reach the targets of Deng Xiaoping's economic modernization program. Industrial use of computers in China has grown dramatically over the past few years. A tremendous range of applications has been reported, including process control in the chemical, metallurgical, and textile industries; resource management in energy-intensive heavy industries; and numerical control of tools used in the machine-building sector.

[REDACTED]

Enterprise Management

Medium and small-sized factories are especially looking to microcomputers to manage personnel records, keep track of inventory, and schedule production and ordering of supplies. Although the number of factories using micros for daily management tasks is not known, the relatively low price of microcomputers and the simplicity of software design for these applications have contributed to an upsurge in demand. The

economywide emphasis on managerial efficiency has spread to military as well as civilian units: Chinese newspapers report the PLA now uses microcomputers for many of its planning and logistic duties.

[REDACTED] moreover, that the PLA's General Logistics Department plans to link IBM 4341 mainframes in each military region to a PLA computer center in Beijing via dedicated ground telephone lines, with IBM personal computers to be placed at permanent lower level PLA facilities.

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Transportation

To handle the exponential growth in freight and passenger traffic on China's rail lines, the Ministry of Railways plans to set up a nationwide computer network using up to 300 Digital Equipment Corporation minicomputers and large amounts of networking equipment and software.

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[REDACTED]

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The Civil Aviation Administration of China (CAAC) also will be upgrading its reservations and scheduling systems with new computers. CAAC signed a contract with a US firm, Sperry, for a computerized reservations system worth \$9 million in May 1985. Its current system—leased from a French firm—can handle 1 million passengers a year; CAAC expects to be booking 13 million passengers each year by 1990. The Sperry computers, which should be in use by early 1986, may also store maintenance records, spare parts inventories, and payroll information for CAAC and for China's regional airlines.

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Petroleum Exploration

China's burgeoning oil exploration effort has left the country able to process only 15 percent of the seismic data it collects. Accordingly, the Ministry of Petroleum seeks at least half a dozen new mainframe computers for use in petroleum exploration. Many of these are for oilfields only now setting up computer facilities, but some are to upgrade data-processing centers in place for several years. Hong Kong is one of the sites slated to receive powerful mainframes on behalf of the Ministry.¹¹ Petroleum industry leaders have also expressed interest in acquiring a US super-computer to handle some of the industry's data-processing tasks.

[Redacted]

[Redacted]

[Redacted]

Weather Forecasting

China's State Meteorological Administration (SMA) and the Chinese Academy of Sciences' Institute of Atmospheric Physics are competing for funds to buy a used Cray-1 supercomputer from the National Center for Atmospheric Research in Boulder, Colorado, for atmospheric modeling calculations.

[Redacted]

[Redacted]

[Redacted]

Economic Planning

China's State Planning Commission has been working since 1980 to establish a nationwide computer network to process economic and statistical information.

[Redacted]

[Redacted]

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Trade and Finance

To minimize the duplication of imports now occurring between cities, China set up a computerized information network to keep records on technology purchases by the country's 14 open cities—which account for one-third of the country's technology and equipment imports. The cities will also be linked to data bases in the United States and Canada containing information on foreign companies, products, and prices. The Chinese press reported the network in operation as of August 1985, although the reports did not disclose the data transmission mode. The sketchiness of the information leaves open the possibility that computer printouts are sent manually from city to city, rather than via telecommunications links. []

The Bank of China is also in the process of computerizing its transaction-processing system, and has bought Hitachi and IBM mainframe computers for its head office and half a dozen of its branches. For its medium and small-sized branches, the bank reportedly may use more than a hundred Burroughs computers—probably built in China under a joint-venture agreement between Burroughs, China's electronics ministry, and a PRC-backed Hong Kong firm. []

Technical Data Libraries

China has been subscribing to computerized technical data bases maintained in the United States, Canada, and Italy for several years, but dissemination of the documents obtained has been by mail—hence, extremely slow. Recognizing that the absence of an adequate system for information exchange has been an obstacle to China's technological and economic development, China's State Council has given high priority to the establishment of a computerized information system for retrieval and dissemination of scientific and technical information from foreign and domestic journals. Construction of the system's headquarters at the State Science and Technology Commission's Institute for Scientific and Technical Information in Beijing began last year. At least 16 cities will be included in the network, for which China has purchased Hitachi mainframes. Chinese press reports indicate that computers are already in place in eight of the cities. []

Strategic Command and Control

[] The computers to be linked include the IBM mainframes acquired for the census, the Honeywell computers supplied to 14 universities, and VAX-series superminicomputers made by the Digital Equipment Corporation—many acquired through third-country intermediaries without US export licenses or COCOM approval. Because of participation in this effort by representatives of China's ballistic missile arm—the Second Artillery Corps—we believe the network is designed to enhance strategic command, control, and communications. Chinese officials have probed US Government willingness to assist with the project. []

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